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OF MAN AND MUSKOX

New light on a very old relationship

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ABSTRACT

The present paper reports the results of archaeological fieldwork (summer, 1977) on northern Banks Island, N.W.T.; and attempts to see if man could have been a major factor in the demise of muskoxen on Banks Island in the late 19th century. V. Stefansson sighted no live muskox on the island during his extensive travels there between 1914 and 1917, although he did sight numerous recent Inuit sites containing muskoxen remains. After questioning Copper Eskimos on Victoria Island, he became convinced these people had exterminated the muskoxen during a brief occupation of Banks Island in the late 19th century. In light of man's possible role in past extinctions of large mammals, examination of the Banks Island situation may contribute significantly to our understanding of man's strategies as a predator.

Forty sites containing remains of at least 1500 individual muskoxen have been found along the Thomsen and Muskox Rivers. The sites have been separated into those containing cultural remains, and apparent kill sites. Minimum number of animals at each kill site ranged from two to 16. This range of group sizes accords well with herd sizes for Banks and Bathurst Island populations which range from two to 96 animals with over 75% of the herds containing less than 17 animals. The remains of both sexes were found at the kill sites and the percentage of males per kill site ranged from 19% to 75% and accounted for approximately 50% of the total sample. Again, these figures accord well with the known sex distribution of Bathurst Island herds where males account for 18% to 90% of each

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herd, and approximately 50% of the total population. Although analysis of ages of the animals in the death assemblages is still in progress, they range in age from those with second molars unerupted (animals approximately six months old) to old adults exhibiting extensive wear on the third molars.

It appears therefore, that the number of animals, and their sex and age distribution, best supports the hypothesis that these assemblages represent single component kill sites, and that the strategy of the hunters was to kill entire herds.

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The purpose of this paper is to present the results of archaeological fieldwork in the summer of 1977 on northern Banks Island, N.W.T. We will discuss the results of this initial fie work and our preliminary analysis, and place them within the context of Banks Island prehistory and some general questions regarding human predator/prey relationships.

Banks Island is the westermost of the Arctic Islands. Very little is known in detail about its natural and cultural history, because few scientific investigations of any sort have been carried out there. Culturally, there appears to have been discontinuous and/or sparse occupations during Pre-Dorset and Thule times and perhaps Birnirk and earlier periods, and again in the second half of the 19th century. This last prehistoric occupation is the focus of this presentation, because of its implications for shedding light on the subsistence strategies of prehistoric hunters-in particular, those of the Arctic, but perhaps also more generally.

The genesis of our specific interest in Banks Island lies in the writings of V. Stefansson (1921) on his extensive travels in the area between 1914 and 1917. While living off the land, he reported that the island contained no live muskoxen whatsoever, but that there were numerous recent Inuit sites that contained the remains of the animals. After questioning Copper Eskimos on Victoria Island, he became convinced that these people had exterminated the muskoxen during a brief occupation of Banks Island in the second half of the 19th century. In light of recent discussions of man-muskox relationships (see esp. Burch 1977; Wilkinson 1975,

1975; Wilkinson and Shank 1975), and the general question of man's possible role in past extinctions of large mammals (e.g., Jelinek 1967; Martin 1967; Wilkinson 1972), elucidation of the Banks Island situation through archaeological and faunal analysis has the potential to contribute significantly to our understanding of man as predator.

Clearly, we cannot summarize the extensive literature pertaining to these subjects here. Even that specifically dealing with muskox can only be briefly noted. (But see Gray 1973; Hubert 1977; Tener 1965; Wilkinson and Shank 1974 as major works. Also see Hone 1934, as a major summary of historic and ethnographic man-muskox relationships up to that time.) There is consensus that muskoxen are highly vulnerable to human hunting because of their sedentism and their distinctive defensive formation. Furthermore, their low rate of reproduction would seem to preclude their sustained predation, and Wilkinson (1975:32) has argued that they were hunted only when other resources failed, in areas lacking alternative resources, or as they happened to be encountered but not as part of a concerted hunting strategy. Nevertheless, it cannot be discounted a priori that a harvesting strategy that emphasized the procurement of animals excess to the needs of reproduction (i.e. males) could have been developed for muskoxen, given the propensity of the bull to place themselves between the females and calves and any predator, and the fact

that differed [illegible] with the principle of [illegible] logical [illegible] basic [illegible] of both modern game management and animal husbandry. Besides these, as many animals as desired, it should have been possible to [illegible] or escape. One of our principal goals was to determine whether such concepts, paralleling modern principles of game management occurred, and if not, to see if we could discern any other specific strategies in muskox harvesting.

The Historical Background

In 1853, the British naval exploration vessel H.M.S. *Investigator*, Robert McClure commanding, was abandoned in Mercy Bay at the [illegible] end of the island after having been in the ice for 20 months (Armstrong 1857). It appears that within a very short period of time perhaps only a matter of months a group of Copper Eskimos hunting on northern Victoria Island had learned of the presence of this abandoned treasure house of wood and metal, and soon began making trips to salvage materials from M'Clure's cache and ship. Informants indicated to Stefansson (1921) that some exploitation of the island took place until about 1890, after which the area was abandoned. Starvation appears to have been a major factor in this withdrawal back to the Victoria Island homeland [illegible]. It should be noted that there was no further European penetration of the island, directly or indirectly, for many years. [illegible] supposed that muskoxen were [illegible] carcasses [illegible], for [illegible] remains on [illegible]

prior to 18[illegible] [illegible]. [illegible] Solander and [illegible] [illegible] found [illegible] of [illegible]. Nor are any reported [illegible] of the [illegible] and scientific literature between [illegible] and [illegible] ([illegible]). The first mention of [illegible] is [illegible]'s observation of about 100 in 1959 ([illegible]), [illegible] be estimated at 1000 [illegible] to be on the island. [illegible] estimates: 150 in [illegible] ([illegible]), 350-plus animals were reported in a limited aerial survey in 1967, 1200 - 1,500 in 1970 ([illegible] 1976) as many as [illegible] in [illegible] (Urquhart [illegible]) and [illegible] ([illegible] and [illegible] 1976), and our observations in 1977 suggest that, in our study area, the population remains at least as high as in [illegible].

All of the above data suggest that [illegible] of [illegible] were found in quantity until the [illegible] century, after which they suffered a precipitous [illegible] [illegible] the in-migration of [illegible] [illegible]. [illegible] cannot be determined with [illegible] [illegible] is strongly suggested, and after [illegible] of [illegible] a new population began to [illegible] through [illegible] or [illegible], the remnant population [illegible] multiplied to the point of [illegible], or some combination of both occurred.

The Archaeological [illegible]

To date, we have [illegible] 45 sites that appear to [illegible] the period [illegible] and which contain at least [illegible] individual [illegible] are located along or adjacent [illegible]

[illegible] types. [illegible] are found on the tops of [illegible] hills and [illegible] slope overlooking [illegible] [illegible] are usually on such higher [illegible] on the adjacent slopes.

We have classified the sites into three major categories. The first type consists of [illegible] features and complexes [illegible]. The range in size from a single [illegible] with an associated midden to those covering several hundreds of square meters with [illegible] remains [illegible], with many [illegible], [illegible]es, and sometimes other features. These sites [illegible] to be residential sites [illegible], and in many cases appear to represent [illegible] [illegible]sions.

The second type [illegible] of generally smaller sites containing [illegible], associated with [illegible] caches, but without the [illegible] characteristic of sites of the first type. They appear to represent transitory camp sites [illegible] hunting and [illegible] areas, and seem to have been occupied for only brief periods perhaps due to a [illegible] subsistence [illegible]. In none of the combination [illegible] or the transitory camp sites were [illegible] these two types of [illegible] three [illegible].

[illegible] of sites consists of [illegible]; the [illegible] remains of [illegible]

[illegible] shallow [illegible] have been [illegible] in a long [illegible]. (e.g. [illegible] of [illegible] material, the [illegible] of a [illegible]. [illegible] and [illegible] in [illegible] any possibility [illegible].

Although the [illegible] collected from these [illegible] has [illegible] 1960; [illegible] 1931). [illegible] items were of [illegible] drawn from the [illegible].

The faunal [illegible] by [illegible] horse, [illegible] the [illegible] 95% of all [illegible] are [illegible] of the faunal [illegible] the [illegible] great [illegible] results (perhaps [illegible], [illegible] some of the [illegible] the material [illegible] of the [illegible] 1964 (5). [illegible]

[illegible] a frequently [illegible], although [illegible] actively collected [illegible] a preoccupation with [illegible] able [illegible] and [illegible] from the [illegible], and [illegible] in those to this business given the [illegible] ation. [illegible] indicates that [illegible] tribes were considered [illegible] in relation to their [illegible] ors and not liable to [illegible] [illegible]. But, [illegible] than would have been [illegible] possession of significant [illegible] derived from the [illegible].

The conclusion that [illegible] of the [illegible] exploitation of the herds [illegible] by our general [illegible] record, however, that [illegible] in their homeland [illegible] employed hunting [illegible] of the herds. [illegible] essential [illegible] the [illegible] usual [illegible] and [illegible] engaged [illegible] did they [illegible] considerable [illegible] deep [illegible] attempting [illegible]

[illegible] to the [illegible]. Answers to these questions, [illegible] parameters, can only be [illegible] of the [illegible] of the hunter; that is, through analysis of the remains of the fauna killed.

[illegible] from faunal analysis

The method of analysis consisted of gathering basic demographic information [illegible] the faunal assemblages at each kill site and comparing this information to similar information [illegible] on extant herds on Banks Island and from herds on Bathurst Island. The basic data sought from the archaeological sample was: 1) the minimum number of animals at each kill site, 2) the sex distribution of the animals at each kill site; and 3) the age distribution of the animals at each kill site. [illegible] were [illegible] kill sites. [illegible] in the [illegible] kill sites [illegible] at [illegible] and [illegible], [illegible] destroying [illegible]. [illegible] single [illegible] many kills of multiple [illegible] and [illegible] how many seasons [illegible] may have [illegible].

Number of animals at each kill site

[illegible] number of animals present at each [illegible] of the skulls. The [illegible] ranged from two to 16, [illegible]

the 30 single remains noted previously. Figure [illegible] shows the frequency distribution of animals per kill site, compared with the frequency distribution of the various herd sizes seen on Banks during July and August, 1977. Extant herds ranged between two and 76 individuals with the average herd size being 11 animals (only one large herd of 76 animals was seen, and likely represents a short term amalgamation of two or more herds. The next largest herd consisted of 40 animals). Numerous solitary bulls were observed. Well over 90% of the herds included fewer than 18 animals. Comparing the death assemblages to this data, it can be seen that no kill site exceeds 18 individuals and the relative frequency of herd sizes and numbers in kill sites is similar.

Because of the limited time period during which observations of herd size was made on Banks Island, the data from the kill sites was also compared to herd sizes seen on Bathurst Island by David Gray from 1968 to [illegible] (Gray, [illegible]). Gray noted that herd sizes on Bathurst Island had mean sizes of four to seven individuals in August and mean herd sizes gradually increased until mean herd sizes of [illegible] to 22 were observed in February, after they again reduced in size to the small herds characteristic of August. Gray also noted that the range of variation in herd sizes varied seasonally, with winter herds varying greatly in number and summer herds being consistently small. While we cannot at the present time determine if there is a seasonal factor involved in the variability in number of animals found at each kill site, we can document the similarity in average herd sizes observed on Bathurst Island to the number of animals

Figure 5 shows the percentage of males in extant Bathurst herds but [illegible] kill [illegible] percentage of males in each kill site if only fully mature adults are analysed. The bulls represent 55% of the animals in this category. The middle histogram represents the percentage of males from kill sites if all animals identified as sex are included, regardless of the age of the individuals. In this category males represent [illegible] of the sample. [illegible] if errors were made in estimating the sex of the younger animals this count would tend to slightly underestimate the number of males since young males would tend to be identified as females. The bottom histogram represents the percentage of males in herds of muskoxen seen on Bathurst (Gray, [illegible]). Gray felt that his counts may have overestimated the number of males, but he did not give his reasons for believing this. As can be seen from comparing the data from the kill sites to the sex distribution seen in the Bathurst herds, the relative proportions of the males in each of the kill sites [illegible] falls within the range of variation of the male proportions seen in extant herds. Gray noted that the sexual composition of the muskoxen [illegible] herds, which were [illegible], with all male herds and solitary males joining and leaving other herds freely. Consequently, it is probable that herds encountered by hunters on Banks Island would be quite variable in their sex composition. This is certainly indicated by the wide variation in sex composition of the death assemblages at the kill sites.

It should also be noted that the overall average of males to females in the kill sites is approximately 50% as [illegible] the overall estimates for the Bathurst herds. Again, [illegible] (197[illegible]) data for the [illegible] sex ratio and with the kinds of variability seen in the [illegible] composition of the herds.

Ages of Muskoxen at Kill Sites

Age estimations of the animals in the death assemblages is continuing and for this part of the research only the most tentative statements can be made. The animals at the kill sites range in age from those with second molars unerupted to animals which exhibit extensive wear on the third molars. In approximate ages, this represents an age range from one-half a year to animals that are many years [illegible]. While we are not yet able to provide a mortality curve for the total assemblage, the scarcity of animals younger than [illegible] was surprising to us. [illegible] This could be due to: 1) [illegible] estimation of the age of eruption of the first molar; 2) [illegible] from the sample of [illegible] and thus more fragile specimens; 3) winter killing of the herds; 4) a hunting pattern which either consciously or unconsciously favored the preservation of calves; or 5) a depression of the rate of reproduction of the muskoxen due to [illegible] (see Gray (1973) for a discussion of this phenomenon). At the present time, however, we are in no position to [illegible] any one of the above interpretations of the age data.

[illegible] interpretations presented above,

the following conclusions on the basis of the preliminary faunal analysis have been made. In general, the range and frequency of the death assemblages falls within the range of variation of extant herd sizes for Banks Island and Bathurst Island. In addition, the sex distribution both in frequency of males per death assemblage and the overall percentage of males to females accords well with the range of variation seen in extant herds and the overall sex distribution of males to females from Bathurst Island. It appears therefore that the evidence best supports the hypothesis that these death assemblages represent single-component kill sites, and that the strategy of the hunters appears to have been the killing of entire herds.

It should be pointed out, however, that two slight deviations from this general demographic pattern may be apparent in the data and that these deviations may indicate the hunters' failure always to be successful at harvesting entire herds. First, if the sex ratio of males to females is slightly greater than [illegible] as the analysis of the adult-only component of the assemblages indicates, it would appear that slightly more males than females were killed. Second, if the lack of calves in the death assemblages is a real phenomenon and not a reflection of seasonal hunting patterns or altered rates of reproduction, it would appear that fewer calves, and in connection with the above possibly fewer cows with calves, were killed. Overall, however, the complete harvesting of herds seems indicated.

[illegible]

The [illegible] of work suggests the following [illegible]:

1. [illegible] speculation regarding anchor [illegible] [illegible].

2. [illegible] conclusions on responsibility and other aspects of the [illegible] of this period [illegible] further study, anchor [illegible] [illegible] of the head as the unit of hunting. [illegible] evidence exists for [illegible] important [illegible].

3. The [illegible] suggests a [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] these informants, the preferred [illegible] entire herd, and the rationale [illegible] grounded in the [illegible] and their relationships to [illegible] [illegible], like Inuit themselves [illegible]

were gregarious and social. Herds approximated the size of Inuit [illegible]. [illegible], to kill only part of a herd would be to destroy the social unit. By killing an entire herd, on the other hand, all of the souls of the slain animals would be kept together and would be reincarnated [illegible], if [illegible] not sustained, this strategy could be as conservationist as any other. Only if, as seems to have been the case on Banks Island, heavy reliance on muskoxen occurred would disaster result.

The third point of interest is far removed from the present case. J.L. Saunders has recently re-analysed the mammoth remains from the Paleoindian kill site at Lehner Ranch, in southern Arizona. Comparing these remains to demographic and behavioural data on contemporary African elephants, he concludes that this site represents an instance when the Clovis hunters "...found it expedient, and easier, to kill a complete family unit which huddled together in concerted defense" (Saunders 1977:[illegible]). It could be noted that the defense mechanisms of modern muskoxen and at least African elephants share a remarkable number of features, including the formation of a kind of "static phalanx", and the charging of individuals out towards attackers.

In summary, these preliminary conclusions require further testing. Our plan is to carry out at least one more field season in the region. This field season will attempt to broaden our site sample size by surveying in two areas that have not yet

[illegible] [illegible] different environments and are expected to have support [illegible] hare, and perhaps fish and waterfowl. [illegible] Examination of the faunal remains from sites in these areas should enable us to ascertain more fully the overall [illegible] activities of the 19th century northern Copper Eskimo on Banks Island. In addition, we will concentrate on obtaining more [illegible] osteological information to ascertain with greater [illegible] on death assemblages demographic data on all prey species.

REFERENCES

Burch, E.S., Jr.
1977 Muskox and man in the central Canadian subarctic 1689-1974. Arctic 30(3):135-154.

Gray, D.R.
1972 Winter research on the muskox (Ovibos moschatus wardi) on Bathurst Island, 1970-71. Typescript, Canadian Wildlife Service Report, Ottawa.

1973 Social organization and behavior of muskoxen on Bathurst Island, N.W.T. Unpublished Ph.D. dissertation, University of Alberta, Edmonton.

Harington, C.R.
1963 Muskox observations of Banks Island, 1850-1963. Canadian Wildlife Service, C.W.S.C. 982, Ottawa. Unpublished.

Hone, E.
1934 The present status of the muskox in Arctic North America and Greenland. Special Publication of the American Committee for International Wild Life Protection, No. 5. Cambridge, Massachusetts.

Hubert, B.A.
1977 Estimated productivity of muskox on Truelove Lowland. In: Bliss, L.C. (ed.). Truelove Lowland, Devon Island, Canada: a high arctic ecosystem. Edmonton: The University of Alberta Press.

Jelinek, A.J.
1967 Man's role in the extinction of Pleistocene faunas. In: Martin, P.S. and H.E. Wright, Jr. (eds.). Pleistocene extinctions: the search for a cause. Proceedings of the VII Congress, International Association for Quaternary Research. New Haven: Yale University Press.

Jenness, D.
1922 Report of the Canadian Arctic Expedition of 1913-18. Vol. XII: the life of the copper Eskimos. Ottawa: F.A. Acland.

1946 Report of the Canadian Arctic Expedition 1913-18. Vol. XVI: Material culture of the Copper Eskimo. Ottawa: Edmond Cloutier.

Kevan, P.G.
1974 Peary caribou and muskoxen on Banks Island. Arctic 27(4):256-264.

Macpherson, A.H.
1960 [illegible] and Victoria Islands, N.W.T.,
during the summer of 1959. Canadian Wildlife Service,
Ottawa. Unpublished.

Martin, P.S.
1967 Prehistoric overkill. In: Martin, P.S. and H.E. Wright
Jr. (eds.), Pleistocene extinctions-the search for a
cause. Vol. 6, Proceedings, VII Congress, International
Association for Quaternary Research. New Haven: Yale
University Press.

McGhee, R.
1972 Copper Eskimo prehistory. National Museum of Man,
Publications in Archaeology, No. 2. Ottawa.

Osborn, S. (ed.)
1969 The discovery of the North-West Passage. M.G. Hurtig
Limited, Edmonton.

Saunders, J.J.
1977 Lehner Ranch revisited. In: Johnson, E. (ed.), Paleo-
Indian lifeways. The Museum Journal, XVII, West Texas
Museum Association, Texas Tech University, Lubbock, Texas.

Stefansson, V.
1921 The friendly Arctic: the story of five years in polar
regions. New York.

Tener, J.S.
1965 Muskoxen in Canada, a biological and taxonomic review.
Queen's Printer, Ottawa.

Urquhart, D.
1973 Oil exploration and Banks Island wildlife. Typescript
on file with the Northwest Territories Game Management
Division, Yellowknife.

Wilkinson, P.F.
1972 Ecosystem models and demographic hypotheses: predation
and prehistory in North America. In: D.L. Clarke (ed.),
Models in Archaeology. Methuen: London.

1972 The relevance of musk ox exploitation to the study of
prehistoric economies. In: Higgs, E.S. (ed.), Papers in
economic prehistory. London: Cambridge University Press.

1975 The relevance of musk ox exploitation to the study of
prehistoric animal economies. Unpublished Ph.D.
dissertation, Cambridge University.

Wilkinson, P.F. and C.C. Shank
1974 The range relationships of muskoxen and caribou in northern Banks Island in summer 1973: a study of interspecies competition. Three volumes. L.G.L. Limited, Environmental Research Associates, Edmonton.

1975 Archaeological observations in North Central Banks Island. Arctic Anthropology 12(1):104-112.

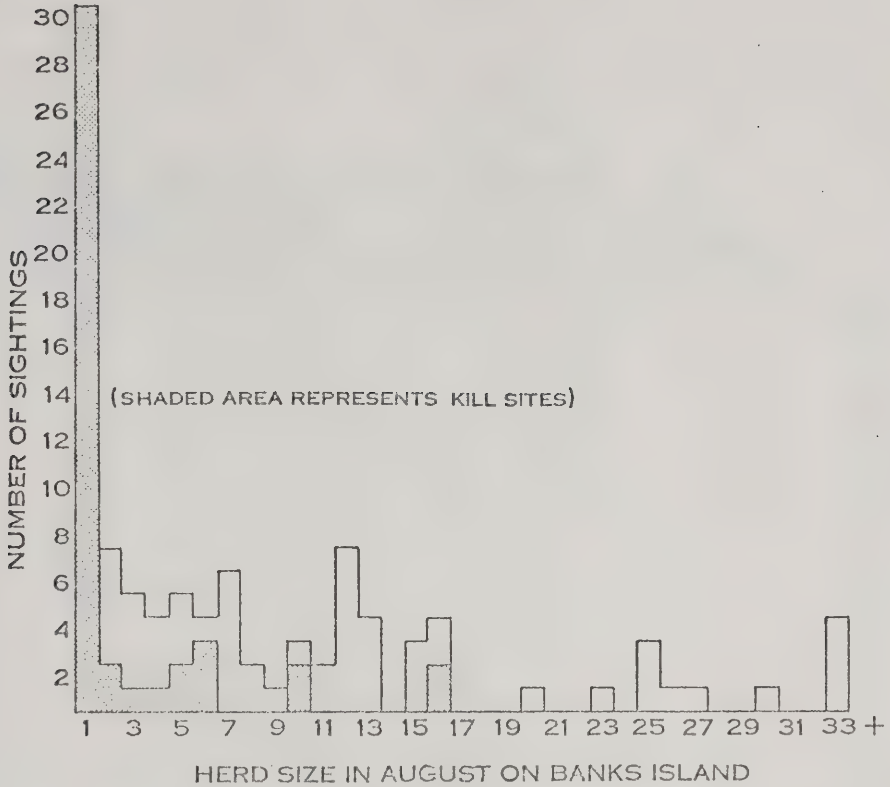

Figure 1: Frequency distribution of animals per kill site compared with the frequency distribution of herd sizes seen on Banks Island.

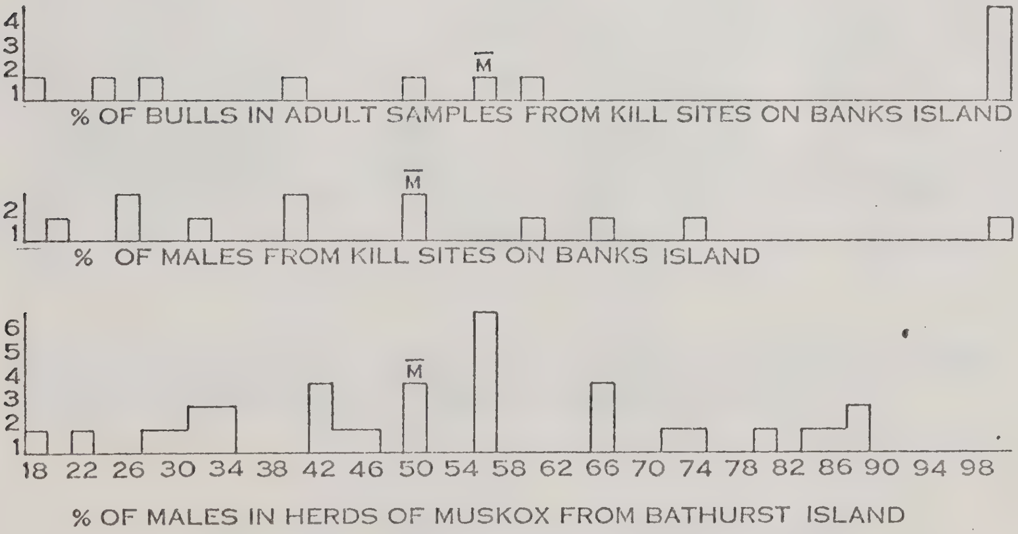

Figure 5. Percentage of Male Muskox in extant Bathurst herds and archaeological Banks Island kill sites.

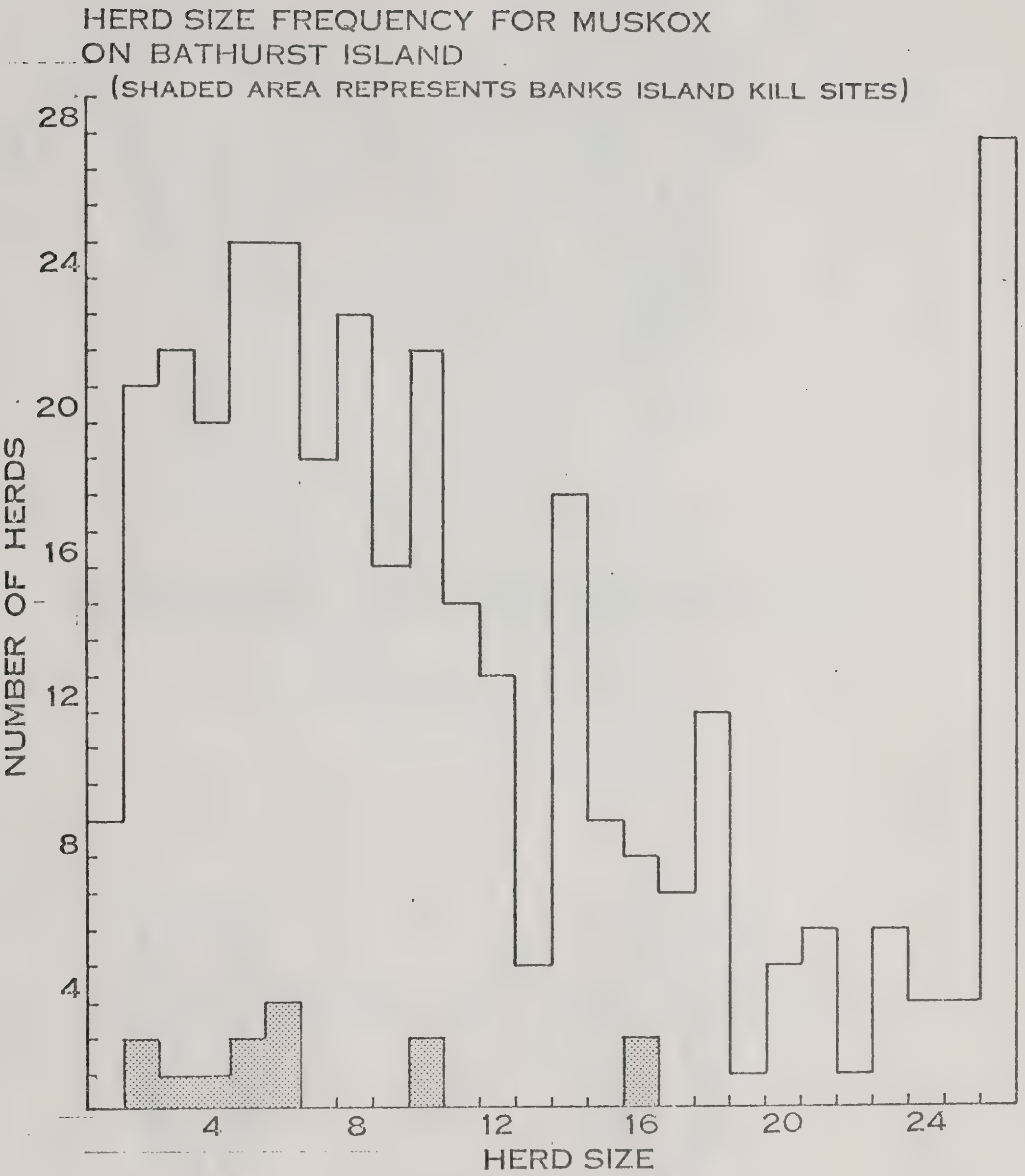

Figure 2. Herd size frequency for Muskox on Bathurst Island. Shaded area represents Banks Island kill sites.

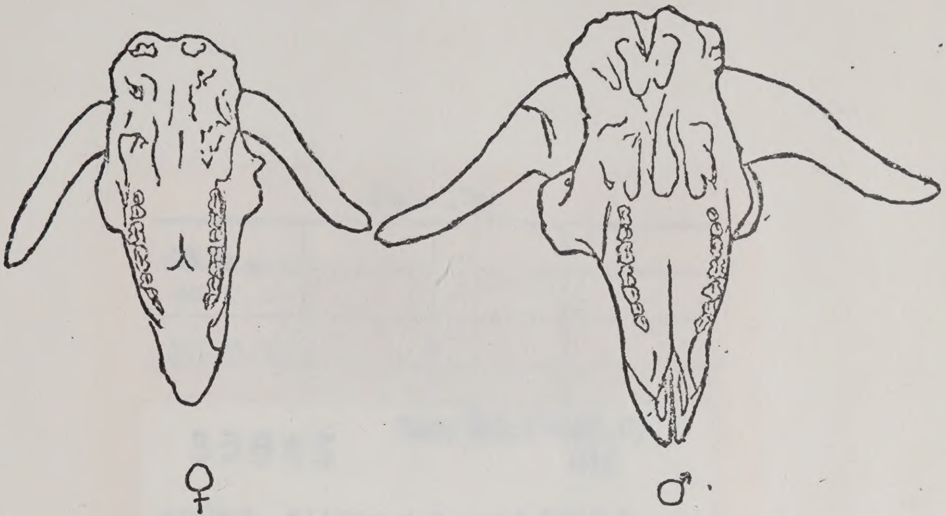

Figure 3. Mature (third molars erupted and worn) male and female muskox skulls. Basicranial view.

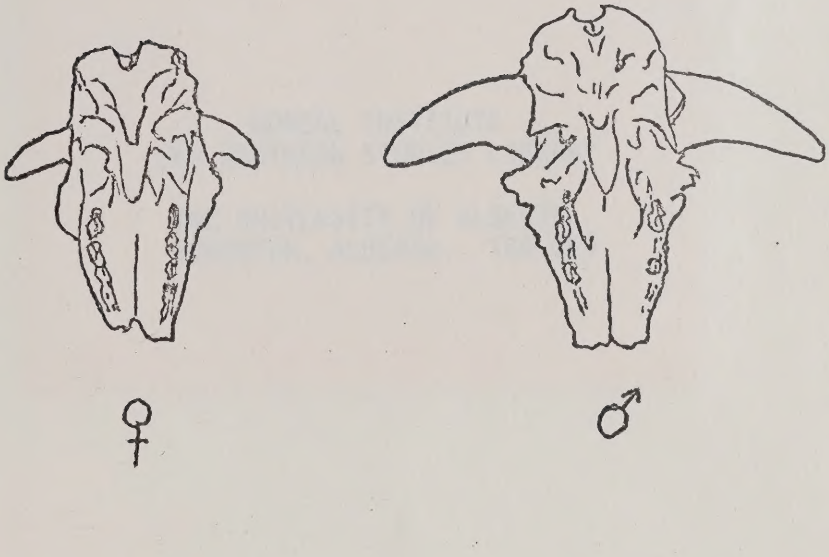

Figure 4. Young male and female muskox (third molar unerupted and the second molars show only moderate wear).

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